

REMARKS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 6-10, 14, 15, 19, 23, 26, 27, 29 and 30 are currently pending in this application. By this Amendment, the applicants amend Claims 6, 8, 9 and 15; leave Claims 7, 10, 14 and 19 unamended; cancel Claims 23, 26, 27, 29 and 30; and add new Claims 39-42. Thus, 12 claims are in this application for reconsideration.

In the outstanding Office Action, Claims 8 and 9 were rejected under 35 U.S.C. §112, second paragraph, for indefiniteness; Claims 6, 10, 15, 26, 29 and 30 were rejected under 35 U.S.C. §102(a) for anticipation by the U.S. Patent of Gentry; Claims 7, 14 and 19 were rejected under 35 U.S.C. §103(a) for obviousness over Gentry; Claims 8 and 9 were rejected under 35 U.S.C. §103(a) for obviousness over Gentry in view of published European Patent Application No. 636,399; and Claims 23 and 27 were rejected under 35 U.S.C. §103(a) for obviousness over International Patent Publication No. WO 96/13463 in view of Gentry.

Regarding the rejection of Claims 8 and 9 under 35 U.S.C. §112, second paragraph, for indefiniteness, the alleged indefinite language contained in Claims 8 and 9 has been removed by defining the structural relationship between the vertical partition and the apparatus. Therefore, withdrawal of the rejection of Claims 8 and 9 under 35 U.S.C. §112, second paragraph, for indefiniteness is respectfully requested.

Independent Claim 6, as amended, is directed to an apparatus for preventing abrasion of a solid catalyst and/or a solid adsorbent while treating waste water. The apparatus comprises a packed bed of the solid catalyst and/or the solid adsorbent and a water-permeable pressure layer having a load which can suppress a deformation of the packed bed of the solid catalyst and/or the solid adsorbent. The packed bed is

provided in a wet-oxidation treatment unit. The water-permeable pressure layer is provided on the packed bed of the solid catalyst and/or the solid adsorbent. This water-permeable pressure layer is a substance having a plurality of rigid metal particles or ceramic particles. If rigid metal particles are used, they are one of stainless steel, titanium and zirconium.

Support for the recitation that the packed bed is provided in a wet-oxidation treatment unit is found in the original specification starting at page 39, line 23, through page 40, line 2.

Independent Claim 6, as well as independent Claim 15, also recites that the rigid metal particles are one of stainless steel, titanium and zirconium. Support for this recitation is found in the original specification at page 24, lines 11-21.

Turning now to the various rejections of the independent claims over Gentry, the applicants respectfully submit that the limitations of exemplary Claim 6, as amended, are neither anticipated nor rendered obvious by Gentry, when considered either alone or in proper combination with the cited European Patent Application or the International Patent Publication.

The prior art device of Gentry and the present invention are different in terms of the kinds of metallic particles constituting the water-permeable pressure layer and/or the dispensing and mitigating layer. The particles for the above layer in the present invention have a higher specific gravity than the alumina balls which are used by Gentry.

The water-permeable pressure layer in the present invention is specifically designed to have a load sufficient to suppress substantially a movement of the solid catalyst while securing flexibility to follow up the movement of the solid catalyst packed bed, as well as having water-permeability.

The dispersing and migrating layer in the present invention is specifically designed to satisfy the desired effect required with respect to high abrasion resistance, corrosion resistance, and strength. For these three purposes, the specific metallic particles are either stainless steel, titanium or zirconium, which are used as the granular substance constituting the water-permeable pressure layer and/or the dispersing and mitigating layer. See the specification at page 24, lines 14-21. Also, see the specification beginning on page 39 at line 23 through page 40 at line 2.

For example, page 24, lines 17-21 of the original specification recites: "In the case of wet-oxidation method, preferable examples used as the granular substance are stainless (SUS), Hastelloy (trademark), Inconel (trademark), titanium, and zirconium,..." As mentioned above, the examples used in the wet-oxidation method do not include alumina. In other words, in the inventive apparatus for treating waste water by a wet-oxidation method, alumina is excluded as a substance since alumina is not preferred to be used for treating waste water by a wet-oxidation method. Thus, according to the inventive apparatus, the packing material suitable for treating waste water by a wet-oxidation method is one of SUS, titania and zirconia.

On the other hand, in the apparatus disclosed by Gentry, alumina balls are used as packing material. If waste water is to be treated in the apparatus of Gentry by a wet-oxidation method, alumina is eluted, i.e. washed out. This result was verified by performing experiments. A Declaration Under 37 C.F.R. 1.132 to verify the results of the experiments is attached hereto.

Gentry discloses a liquid-phase catalyst assembly for a chemical process tower in which alumina balls are used. However, these alumina balls have the following disadvantages.

First, the alumina balls have such a small specific gravity that they fail to exert a load onto the water-permeable pressure layer, which load is sufficient to suppress movement of the solid catalyst packed bed. Thus, the alumina balls fail to provide the desired effect obtained by the water-permeable pressure layer of the present invention.

Secondly, if the water-permeable pressure layer and/or the dispersing and mitigating layer use alumina balls in a wet-oxidation treatment unit, the alumina therein may be oxidized to dissolve in the case of treating waste water having a low pH or in the case of treating waste water for a long period of time.

Because of these disadvantages, the preferable substance used in the wet-oxidation treatment unit of the present invention is a substance constituted by either stainless steel, titanium or zirconium and not alumina.

Thus, Gentry fails to teach or suggest that an apparatus for preventing abrasion of a solid catalyst and/or a solid adsorbent while treating waste water may include a water-permeable pressure layer composed of a substance having a plurality of rigid metal particles that are one of stainless steel, titanium and zirconium.

With regard to the references of the European Patent Application and the International Patent Publication, they fail to supply the deficiencies existing in the prior art reference of Gentry. Thus, these differences between the present invention and the prior art devices make it unobvious to change the reference of Gentry to incorporate any elements from the European or International references that would render the present invention obvious. Therefore, the present invention as a whole is patentably distinguishable from the combination of cited prior art references.

Based upon the above discussion, it is respectfully submitted that the independent claims are patentably distinguishable over the applied references. Therefore, the dependent claims are likewise patentably distinguishable thereover.

In conclusion, the applicants believe that it would not be obvious for a person skilled in the art to devise the present invention by combining the teachings of Gentry with either the teachings of the European Patent Application or the International Patent Publication.

Consequently, in view of the foregoing amendments and remarks, no further issues are believed to be outstanding and the present application should be considered in condition for formal allowance. Therefore, a quick and favorable action is respectfully requested.

Respectfully submitted,

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Marked-Up Copy

Serial No: 09/147,428

Preliminary Amendment Filed on:

02-12-03

IN THE CLAIMS

Claims 6, 8, 9 and 15 are amended as shown below.

6. (Six Times Amended.) An apparatus for preventing abrasion of a solid catalyst and/or a solid adsorbent while treating waste water, comprising:

- a packed bed of the solid catalyst and/or the solid adsorbent; and
- a water-permeable pressure layer having a load which can suppress a deformation of the packed bed of the solid catalyst and/or the solid adsorbent;

wherein the packed bed is provided in a wet-oxidation treatment unit;

wherein the water-permeable pressure layer is provided on the packed bed of the solid catalyst and/or the solid adsorbent;

wherein the water-permeable pressure layer is a substance having a plurality of rigid metal particles or ceramic particles; and

wherein the rigid metal particles are one of stainless steel, titanium and zirconium.

8. (Five Times Amended.) The apparatus according to claim 39 [6], wherein:

[the respective segments formed by]

[a] said vertical partition forms the respective segments each with [have] a cross-sectional area of 50 to 5000 cm².

9. (Five Times Amended.) The apparatus according to claim 39 [6], wherein:
[a] said vertical partition has a height of 20 to 300 cm in [a] the vertical direction.

15. (Five Times Amended.) An apparatus for preventing abrasion of a solid catalyst and/or a solid adsorbent while treating waste water, comprising:

a packed bed of the solid catalyst and/or the solid adsorbent; and

a layer configured to disperse and mitigate an upward stream of the waste water and/or a waste gas;

wherein the packed bed is provided in a wet-oxidation treatment unit;

wherein the dispersing and mitigating layer is provided under the packed bed of the solid catalyst and/or the solid adsorbent;

wherein the dispersing and mitigating layer is a substance having a plurality of rigid metallic particles or ceramic particles; and

wherein the rigid metallic particles are one of stainless steel, titanium and zirconium.

23. (Canceled.)

26. (Canceled.)

27. (Canceled.)

30. (Canceled.)

39. (New)

40. (New)

41. (New)

42. (New)